Low Velocity Impact Characterisation of Carbon/Epoxy Laminates processed through Resin Infusion Technique

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Abstract

This work deals with low velocity impact characterization of Carbon epoxy laminates processed through resin infusion technique. The laminate thicknesses and the ply layup sequences selected for this study are based on the layup sequences used in the top skin of the light transport aircraft-SARAS. This work is part of damage tolerance studies on composite structures towards structural certification and substantiation of the composite wing of SARAS-PSA. Low velocity impact tests are performed according to ASTM standards using a drop tower under room temperature and ambient humidity condition. Test results are presented to show the kinematic, dynamic and energy parameters and their dependency on the incident energy and laminate thickness.

Nomenclature

Ei	=	Incident/striking impact energy, in Joules
Tt	=	Total duration of the impact event, in milliseconds
Fmax	=	Maximum load taken by the specimen during impact, in kN
Dmax	=	Maximum deflection of the specimen during impact, in mm
Emax	=	Actual impact energy on the specimen, in Joules
E_p	=	Percentage energy absorbed by the specimen during impact

Introduction

Composite materials are widely used in aerospace structures mainly due to their high specific strength and stiffness, coupled with increased durability and lower maintenance costs. Most primary composite aero structures use prepreg based autoclave moulded Carbon epoxy